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August 8, 2003

CERTIFIED MAIL
7002 1000 0004 6879 0912

Mr. Richard Chase
c/o Gregory Canyon Ltd.
991-C-404 Lomas Santa Fe Drive
Solana Beach, California 92075

In reply refer to:
LD:06-0024.02:tamac

Dear Mr. Chase:

SUBJECT: ADDITIONAL COMMENTS ON THE JOINT TECHNICAL DOCUMENT FOR GREGORY CANYON LANDFILL DATED JUNE 2003

As you know, by letter dated July 6, 2003, the Regional Board determined the Joint Technical Document (JTD) for Gregory Canyon Landfill to be incomplete. We also indicated that the Regional Board would provide any additional comments to you by August 8, 2003.

Based on further review of the JTD, the Regional Board has the following additional comments:

Appendix C: Geologic, Hydrogeologic and Geotechnical Investigations Report

<u>Section 2.0, Hydrogeology</u>

1. Page 2-17, 2.5 Proposed Monitoring and Reporting Program

   It is recommended that this section be deleted from Appendix C. Appendix G contains the Monitoring and Reporting Plan for the proposed Gregory Canyon. It could simplify the text to compile this information into one location in the JTD.

2. Page 2-18, Gregory Canyon Landfill, Detection Monitoring Program

   GLA-2 and GLA-3 are shown as proposed water level measuring stations. However, these existing wells are not included in the table on Page 2-18. Please reconcile the information on Plate 3 and in the table on page 2-18 to make the description of the detection ground water monitoring network consistent throughout the JTD.

3. Table 2-20, Site Monitoring Well Information

The reported depth to water in ground water monitoring well GLA-4 varies widely, from 60.39' to 165'. The depth to water in the other ground water monitoring wells do not contain this same variation. What is the explanation for this variation?

<u>Section 3.0, Geotechnical Analyses</u>

Some of the comments on this portion of Appendix C are in response to a letter dated May 13, 2003 from GeoLogic Associates (copy attached). The cross-references for the comments in the revised JTD (for the May 13, 2003 letter) are included printed in italics. All other comments are not italicized.

4. *Page 3-7, Dynamic Analysis, fifth paragraph, Bray's 1998 Paper*

The calculations submitted for evaluation of the cover performed using Bray, *et al* require clarification. Bray's sample calculations for cover sliding include values for the maximum horizontal acceleration (MHA) top, and maximum horizontal equivalent acceleration cover. These values are not evident in the calculations submitted and therefore they do not appear to strictly follow Bray's approach (Bray, *et al*, 1998). Please explain the discrepancies.

Bray has stated that simplified procedures should be used with caution when estimating seismic loading for cover systems since the MHA calculated for the crest of a landfill can vary erratically for relatively modest variations in landfill configuration and input motions. Although he believes that procedures presented in Bray, *et al*, 1998 provide a "reasonable method for estimating cover displacements". Bray further states that for critical projects, where the results of simplified analysis are sensitive to the input parameters, a properly performed site specific analysis will always provide additional insight. After a discussion with our consultant at the Department of Water Resources/ Division of Safety of Dams (DWR/DOSD) we ask that stability calculations be performed using the simplified Makdisi and Seed (1977), "A Simplified Procedure for Estimating Earthquake-Induced deformations in Dams and Embankments" approach as a check on results obtained using Bray (1998).

5. *Page 3-8, first paragraph, last sentence*

Page 3, Paragraph 5

We would appreciate knowing the source of the data supporting your conclusion that "the vast majority of them [sanitary landfills] did not experience large displacements even during strong earthquakes." Measured and documented small displacements of landfill components associated with strong earthquakes would be especially useful. To our knowledge, the literature indicates that only three modern landfills with geosynthetic liner systems have been subjected to earthquake induced strong ground motion, and one of them, Chiquita Canyon Landfill experienced "significant damage", and the other two "moderate damage" during the 1994 Northridge (M6.7) earthquake. The "significant damage" consisted of two tears in the geomembrane liner, one approximately 3 m and the other about 23 m in length. Since there are approximately 180 active landfills in California, performance based data from only 3 landfills does not create much of a seismic stability data base.

6. *Page 3-8, second paragraph*

Yield acceleration

A yield acceleration of 0.10g is usually indicative of a design incorporating either steep slopes or weak material strengths or both. This yield acceleration seems to be low for a landfill cross section designed to Title 27 standards using typical material strengths. Please discuss the reasons for the relatively low yield acceleration used in the analyses.

7. *Page 3-8, third bulleted item*

Page 4, Paragraph 1

Please identify the source for the near-field magnitude 7 event on the Elsinore Fault used in the hazard assessment. Was the Division of Mines and Geology-Open File Report 96-08, used as the source?

8. Page 3-9, third parameter listed

Cover soil/geomembrane interface

What is the source for the cover soil textured linear low-density polyethylene geomembrane interface friction angle of 24 degrees? Is this figure supported by testing? Martin *et al*, 1984, Williams and Houlihan, 1987, Mitchell et al., 1990, and Sharma and Hullings, 1993, report clay/textured high density polyethylene geomembrane friction angles of 7 to 35 degrees and recommend 9 to 15 degrees.

9. *Figure 3-1*

Page 3, Figure 1

The critical aspects of slope stability associated with a "long horizontal run of liner" as compared to a "steeper, higher slope" are unclear as presented. In a general sense, the response indicates that a cross-section oriented closer to perpendicular would be more stable rather than less stable. Typically a steeper, higher slope is inherently less stable than a more shallow, lower slope. Therefore, a cross-section oriented perpendicular to the slope face should be indicative of most critical stability conditions. Orienting a cross-section other than perpendicular to the slope face creates a shallower slope face while also decreasing slope height. It is unclear exactly what degree of impact the length of the liner run would have on stability. Please explain at what point liner run length becomes the controlling stability factor for Section A-A'. What methods were used to derive the most critical orientation for Section A-A'?

10. *Figure 3-3A*

Page 3, Figure 4

Slope stability report submittals typically include computer printouts for the analyses/calculations. We prefer having the opportunity to review these printouts rather than simply a summary of the basic input data and analytical results.

11. Figure 3-7

a. Fill height

Waste fill height for the permanent displacement evaluation cross-section A-A' is 300 feet, but this does not appear to represent the maximum height of the waste fill? The cross-section appears to indicate a maximum waste fill height of approximately 530 feet. Which is the more accurate maximum fill height?

b. Slope angle

The cross-section appears to depict slope angles corresponding to ratios of 4.5:1 to 5.5:1 (between benches). The table titled "Calculated Factors of Safety Final Cover Components" in Attachment 5, analyzes a slope 40 feet high (between benches) at an angle of 3.0:1. It seems that if the yield acceleration derived for the case of 4.5:1 to 5.5:1 slope angles is 0.10g, it follows that the yield acceleration for the case of a 3.0:1 slope would be lower. A lower yield acceleration would typically increase the amount of permanent deformation for the slope. Please explain why the slope angle for the cross-section used in the analysis to derive the yield acceleration, which appears to depict the final configuration, is considerably different than the slope angle used in the stability analyses for the final cover?

Appendix D: Stormwater Pollution Prevention Plan and Monitoring Program and Reporting Requirements

12. Page 6, first paragraph, second sentence

The current design includes two desiltation basins. If the desiltation basins are designed to accommodate the estimated soil loss from a maximum disturbed area of 75 acres, then will there be a need to add another desiltation basin since the landfill footprint will be 196 acres?

13. Figure 2, Site Map

Please provide a site map that includes all of these ancillary facilities:

- Scales/Fee Booths
- Recyclable goods center
- Groundwater treatment facility
- Administration/Visitor Center
- Maintenance building
- Household hazardous waste storage area
- Equipment and storage area
- Maintenance and Fueling areas
- Clarifier
- Leachate and Subdrain storage tanks

14. Page 14, first paragraph

What is the plan for disposal or treatment of sediment or oil ("wastes") collected in the clarifier?

15. Page 16, 5.0 List of Potential Pollutants that may be Present in Stormwater

The list of potential pollutants needs to include any pollutants that may be added by maintenance activities of heavy equipment including lubrication and oil changes. In addition, the list should also include any pollutants that might be contained in the hazardous waste storage area and include heavy metals, pesticides and herbicides (as noted in 3.2, Analytical Requirements, Monitoring Program and Reporting Requirements Plan).

16. Page 20, 9.3 Preventive Maintenance

This section of the SWPPP must include a discussion of the maintenance of the clarifier and the desiltation basins. Please ensure this information is contained in the next JTD submittal.

17. Page 22, 9.5, Spill Prevention and Response, first paragraph

There is a reference to an Emergency Response Plan (Section E.3 of the JTD). This section of the JTD is missing. Please ensure this is included in the next JTD submittal.

18. Page 24, 9.7 Employee Training

The discharger shall ensure that records of all training sessions be maintained. This language should be added to the SWPPP in the next JTD submittal.

19. Page 4, 3.2 Analytical Requirements, Water Quality Parameters

It will be necessary to add iron to the list of water quality parameters to the Monitoring Program for the proposed Gregory Canyon Landfill. Please see Table D, *Water Quality Order No. 97-03-DWQ, National Pollutant Discharge Elimination System (NPDES) General Permit No. CAS000001, Waste Discharge Requirements for Discharges of Storm Water Associated with Industrial Activities Excluding Construction Activities.*

20. Page 5, first paragraph, Monitoring Program and Reporting Requirements Plan

At the end of the first paragraph, the last sentence should read as follows: "... subsequent analyses of that pollutant will be eliminated until the pollutant is likely to be present again."

21. Page 6, 4.2 Wet Season Observations, Monitoring Program and Reporting Requirements Plan

The first paragraph needs to be modified to ensure that visual observations during the rainy season will be conducted monthly whether or not there is a significant storm event.

22. The Monitoring Program and Reporting Requirements Plan needs to include visual observations of stored or contained storm water at the time of discharge. The contained storm water also needs to be sampled at the time of discharge. Please ensure that the next JTD submittal contains this information in the SWPPP.

Appendix G: Monitoring and Reporting Plan

23. Page 9, 2.5 Local Geology, Surficial Soils

The second sentence makes a general statement regarding the thickness of topsoil in Gregory Canyon. Please include this information in the next JTD submittal.

24. Page 8, 2.5 Local Geology, Colluvium

The second sentence of the third paragraph contains a general statement regarding the thickness of colluvial deposits and surficial soils. The third sentence contains a vague description of the thickness of colluvium in the debris chutes and drainage channels. Please include this information in the next JTD submittal.

25. Page 9, 2.5 Local Geology, Tonalite (Kbt)

The entire fourth paragraph needs to be revised to provide specific information regarding the contact between the tonalite and metamorphic rock. The dip angle for the contact needs to be verified in the field. Please include this information in the next JTD submittal.

26. Page 12, 2.52 Local Structural Geology, Discontinuities in Boreholes

This paragraph needs to be revised to provide specific information on secondary porosity for the fractured bedrock. Please include this information in the next JTD submittal.

27. Page 19, Surface Water Monitoring Points

Are surface water sampling results from GCSW-1, as a background monitoring point, necessary? Sample collection from this point could be infrequent and, the results from this location would reflect only the water quality of rainfall runoff. Comparison of data from GCSW-1 with data from GCSW-2 may be of limited use since the monitoring results for GCSW-2 would reflect the water quality of the San Luis Rey River. How would you propose to determine impacts on surface water from the landfill using these two proposed sampling locations?

Surface water sampling point GCSW-2 is located downgradient of the point of compliance ground water monitoring wells for the landfill. We do not recommend using this location as a surface water monitoring point. If the point of compliance wells detect leakage from the landfill, the impacted ground water could impact the San Luis Rey River. In addition, if the desiltation basin becomes full and discharges sediment into the San Luis Rey River, this surface water sampling point may not be representative of background surface water quality. We recommend moving this surface water sampling point upgradient of the point of compliance ground water monitoring wells.

28. Table 2

Ground water monitoring well, GLA-9 is indicated as dry during previous ground water sampling events (see Figure 4). The Monitoring and Reporting Plan does not indicate a proposed use for this well. What is the intended purpose for this well? Will it be included in the ground water monitoring network, used as a piezometer or will it be abandoned?

29. Figure 5

Ground water monitoring wells GLA-14, GLA-C and GLA-16 are denoted as point-of-compliance wells in Table 2. However, these monitoring wells are located at a considerable distance downgradient of the landfill and may be incapable of providing the earliest detection of a release from the landfill in accordance with Title 27, Section 20420(b). It may be more prudent to locate additional point-of-compliance wells at the mouth of Gregory Canyon in order to provide the earliest detection of a release from the proposed landfill.

30. Notice of Determination

A Notice of Determination from the lead agency stating that the discharger has complied with the requirements of the California Environmental Quality Act (CEQA) must be submitted with the next JTD submittal.

The heading portion of this letter includes a Regional Board code number noted after "In reply refer to:" In order to assist us in the processing of your correspondence please include this code number in the heading or subject line portion of all correspondence and reports to the Regional Board pertaining to this matter.

If you have any questions please contact Ms. Carol Tamaki at (858) 467 – 2982.

Sincerely,

John R. Odermatt

John R. Odermatt
Senior Engineering Geologist

JRO:cat

Attachment

cc (with attachment): Interested Parties List

GeoLogic Associates

Geologists, Hydrogeologists and Engineers

May 13, 2003
9539-65

Gregory Canyon Landfill Ltd.
991-C-404 Lomas Santa Fe Drive
Solana Beach, CA 92075

RESPONSE TO STATE WATER RESOURCES CONTROL BOARD
LETTER DATED MAY 7, 2002
GREGORY CANYON LANDFILL
SAN DIEGO COUNTY, CALIFORNIA

In response to the comments from the State Water Resources Control Board (Board) dated May 7, 2002 regarding the Gregory Canyon Landfill, **GeoLogic Associates (GLA)** provides our responses (in the order that they were presented in the Board's letter), as follows. In addition, we are currently in the process of updating the JTD and will provide this information (along with the updated seismic analysis using the MCE) under separate cover.

RESPONSE TO COMMENTS

Page 3

1. Paragraph 3- Figure 4 (attached from our memo dated April 23, 2002) shows the critical failure surface being referred to. The figure shows that the critical failure surface does not extend to the back slope area.

2. Last paragraph- Comment noted. No response needed.

Page 4

3. Paragraph 1- The "estimated" peak ground acceleration (PGA) was based on an evaluation of the seismic exposure of the site presented in Appendix G of the JTD. The estimate represented the mean value for a near-field earthquake of Magnitude 7.0 associated with the Elsinore Fault at a distance of about 6 miles from the project site. The evaluation considered attenuation relationships developed by Boore et al. (1997), Abrahamson and Silva (1997), and Campbell (1997).

4. Paragraph 5 - The PGA value used was the maximum value from the three attenuation relationships mentioned above (0.38g), rounded up to 0.40g.

5. Paragraph 6 – The kinetic stability for potential wedge or block type failures was evaluated and discussed on pages 8-13 in Appendix G of the JTD. The evaluation indicated no potential for these types of failure.

16885 W. Bernardo Dr., Suite 305, San Diego, CA 92127 Phone: (858) 451-1136 Fax: (858) 451-1087

RESULTS OF SLOPE STABILITY ANALYSIS

Page 2

6. Table-- The NA on the table for unit weights of the interfaces only indicated that actual data is Not Available. In the analysis, the interface is represented by very thin layer of a material with shear strength properties at the weakest interface in the liner system. A unit weight of 10 pcf was assigned to simulate the weight of small thickness of the materials involved in the interface. In-house analyses using significantly higher unit weight for the layer representing the interface showed no significant change in the calculated factor of safety.

Page 3

7. Paragraph 4 – Please see the response to items 3 and 4, above.

8. Paragraph 5 – Comment noted. It may be noted that, although it is prudent to limit the acceptable deformation to 6 inches or less, the past performance of sanitary landfill during earthquakes has indicated that a vast majority of them did not experience large displacements even during strong earthquakes.

9. Figure 1 – Section A-A' represents a cross section with the longest run of the liner system and steepest fill slope gradient. As cross-sections oriented in other directions would have a shorter horizontal "run" of the liner and flatter fill slopes (which would have less driving force and thus, a higher factor of safety), these were not considered critical for stability evaluation.

10. Figure 3 - The waste was modeled in a moist condition. A typical unit weight for waste in a dry condition is 30 to 50 pcf. The unit weight used in the analysis (80 pcf) represented compacted waste in partially saturated condition.

11. Figure 4 – Please see the response to item 6 above. The printout presented in Figure 4 is the output from the computer program. Other files generated by the program provide no usable information.

12. Permanent Displacement Evaluation - For the selection of 0.40g as the site acceleration please see the response to item 3 above. It represents a statistical mean of the maximum accelerations typically recorded during the time histories of earthquakes similar to the MPE for the project (i.e. a magnitude M=7 near-field earthquake).

13. A yield acceleration of 0.10g....- The yield acceleration value for a slope is based on a combination of factors including slope gradients, slope height, and material properties. The value, by itself, is not indicative of steep gradients or weak materials and should not be considered as low or high. The importance of the yield acceleration is only in relation to the seismic forces imposed on the slope. The value

of 0.10g obtained for the proposed slope is a result of the combination of these factors.

There is a typographical error in the equation MHEA = 0.43 x MHA. The factor 0.43 (ratio of MHEA/MHA) should be 0.35 as described in the calculations. This was the value used in the calculations shown on the next line. This typo does not change the conclusion that the dynamic displacement is approximately 1/4 inch.

14. Bray's 1998 paper....- There is no inherent limitation of the height of slope for which the procedure presented in the paper by Bray and Rathje (1998) can be applied. The authors have not limited their analysis as such. The height of the landfill is considered in the analysis. Furthermore, the cases analyzed in the paper were landfill waste heights of 10m, 20m, 30m, 45m, 60m, and 90m. The 90m (295 feet) case is very similar to the average waste height of 250 to 300 feet proposed for the Gregory Canyon Landfill. The Bray and Rathje procedure analyzes landfill slope heights in terms of their fundamental period (T_s). Slopes with a wide range of T_s values, including that estimated for the proposed Gregory Canyon Landfill slopes, are included in the analysis.

    The method presented by Bray and Rathje (1998) was considered more appropriate than the Makdisi and Seed procedure for this project because the Bray and Rathje method uses the concepts from the Makdisi and Seed procedure with special corrections for project-specific seismic conditions such as: foundation conditions, waste height, dynamic properties of the waste, and the predominant period of the waste. The method also takes into account observations performed for such landfill slopes during past earthquakes.

We trust that the responses contained herein adequately address your concerns. If you have any additional questions or need additional information, please contact the undersigned at (858) 451-1136.

GeoLogic Associates

Joseph G. Franzone, PE, GE
Supervising Geotechnical Engineer

Distribution: (2) Addressee

Attachments: Figure 4 (from GLA memo dated April 23, 2002)

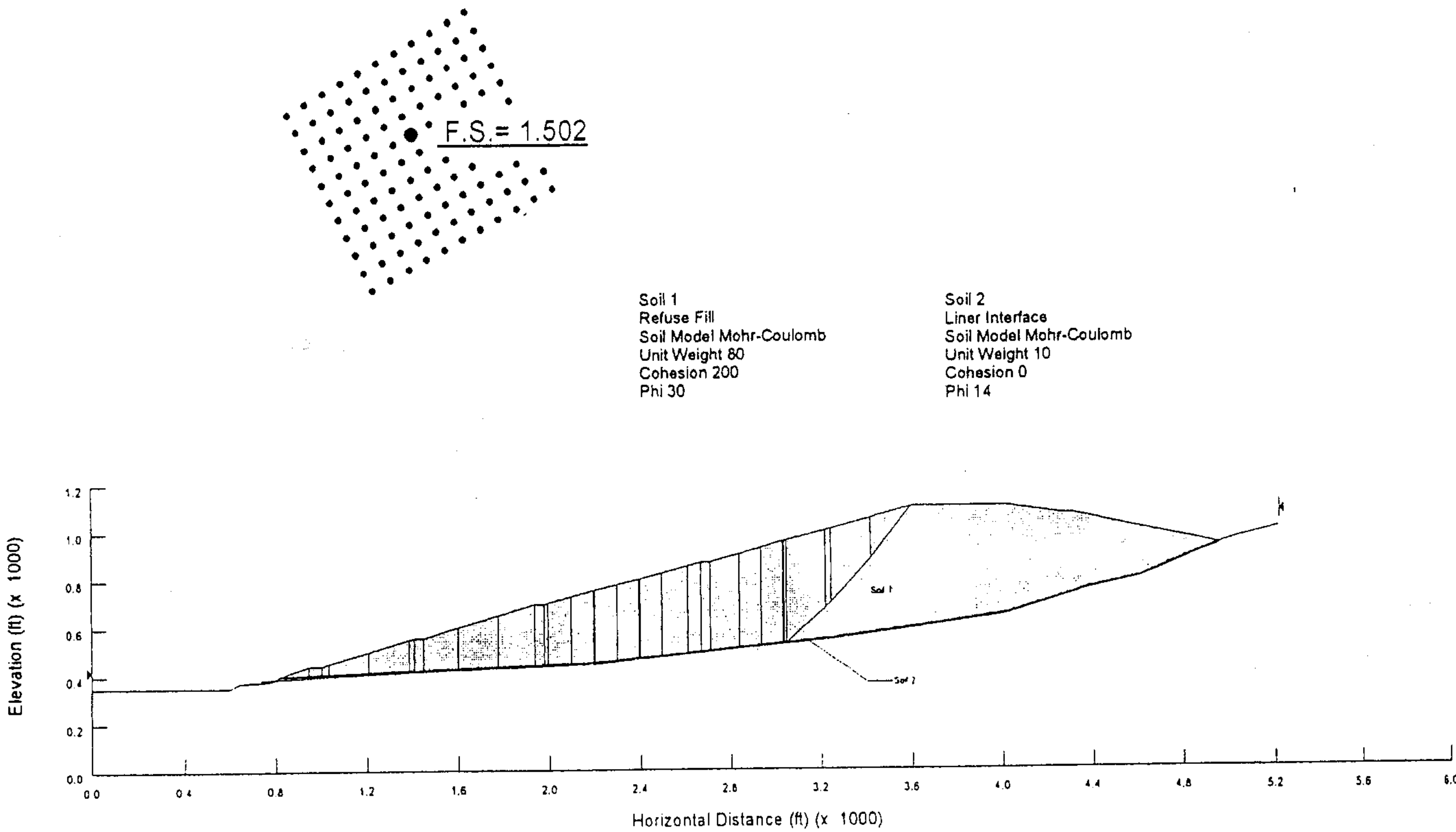

FIGURE 4

STATIC ANALYSIS

SLOPE STABILITY EVALUATION
PROPOSED GREGORY CANYON LANDFILL
SAN DIEGO COUNTY, CALIFORNIA

GeoLogic Associates
Geologists, Hydrogeologists, and Engineers

DRAWN BY:	DATE:	JOB NO.
JNM	MAY, 2001	9539

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